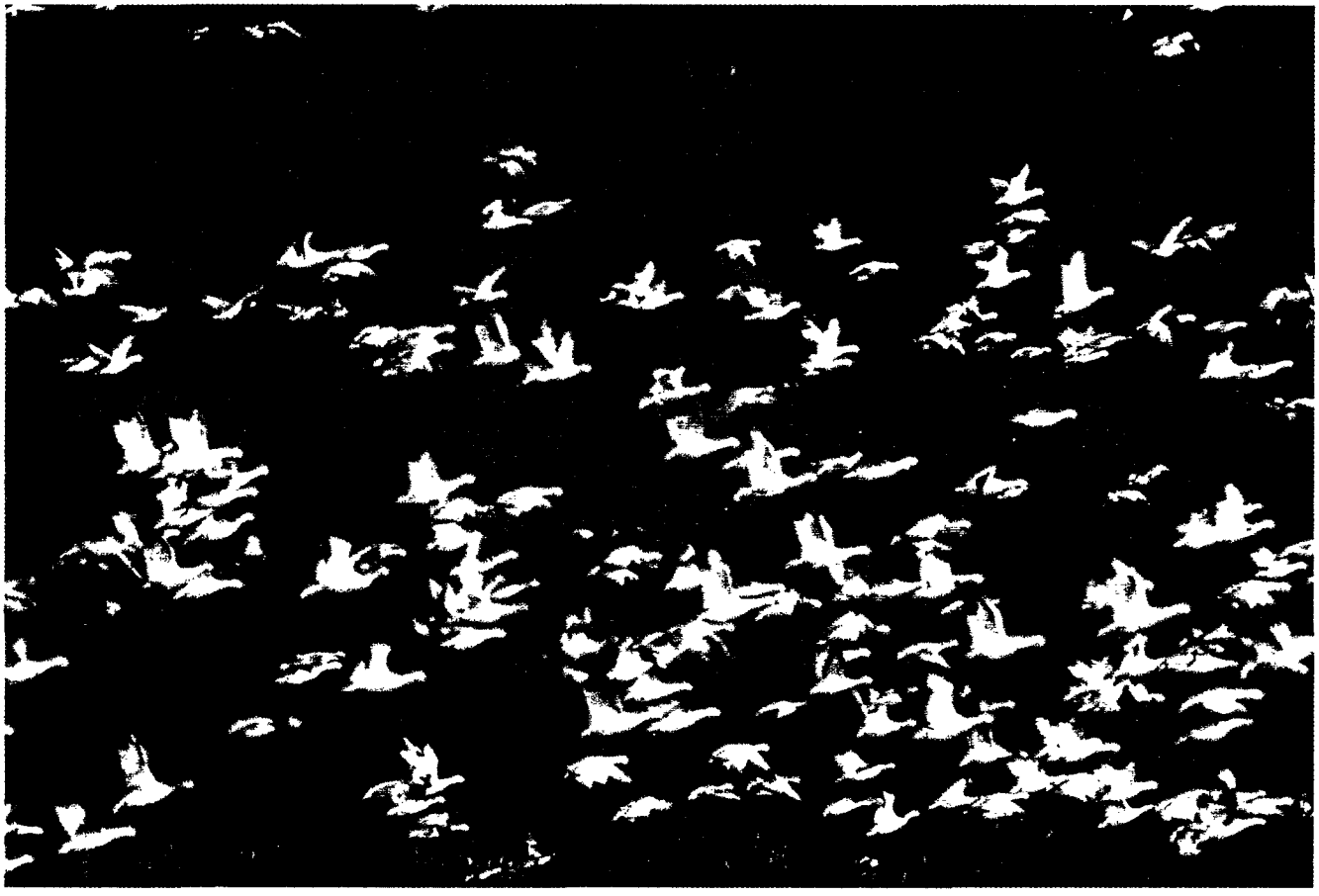
CHAPTER IV L

Merced National Wildlife Refuge Alternative Plans



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MID-PACIFIC REGION

CHAPTER IV L

MERCED NATIONAL WILDLIFE REFUGE

The Merced National Wildlife Refuge (Refuge) was established in 1951 by authority of the Lea Act for the purpose of alleviating crop depredation and providing habitat for migratory and wintering waterfowl. The 2,562-acre refuge is managed by the Service and is one of the most important wintering areas in California for up to 30,000 snow and Ross' geese and up to 10,000 lesser sandhill cranes. The Refuge is located in Merced County approximately nine miles southwest of the City of Merced.

Water is primarily used for management of seasonal marshes and croplands. The seasonal marshes are disced and seeded with wild millet every three to five years and flooded in the fall. Grain and forage crops are grown on the Refuge as wildlife food crops. During 1982, 80 acres of cropland were converted to pasture for goose and sandhill crane habitat. Another 80 acres were converted in 1986. Much of the upland areas have been designated potential habitat for the endangered blunt-nose leopard lizard.

A. WATER RESOURCES

Water is diverted by the Refuge from Deadman Creek and the East Side Bypass on an as-available basis. Most of the water supply for the Refuge is provided by groundwater.

1. Surface Waters

Deadman Creek flows through the northern portion of the Refuge, as shown in Figure IV L-1. The Refuge obtained water rights in Deadman Creek in 1985 for 3,000 acre-feet per year to be taken between December 15 and May 31. However, under the conditions of the water rights, the Refuge cannot divert water from this stream except during high flow periods. Therefore, this water source is not considered to be a firm water supply. Periodic water quality sampling has indicated no water quality problems. Deadman Creek has adequate capacity to transport additional flows to the Refuge.

Water is also obtained from the East Side Bypass which is part of the Lower San Joaquin River Flood Control Project. The East Side Bypass diverts San Joaquin River floodwaters around San Joaquin River channel from a point upstream of the Mendota Pool to the junction of the San Joaquin River and Bear Creek. The East Side Bypass also intercepts waters from the Fresno River, Berenda and Ash Sloughs (tributaries of the Chowchilla River), the Chowchilla River, Deadman Creek, Owens Creek, and Bear Creek. Water quality in the East Side Bypass is unknown, however, the Service estimates that no quality problems exist (USBR, 1986a).

2. Water Conveyance Facilities

Water is delivered from Deadman Creek and the East Side Bypass through several pumps and diversions dams. Both the surface water and groundwater are distributed throughout the Refuge in a series of ditches. Ditches and open pipelines supplying the Refuge lands located along both sides of the East Side Bypass do not have adequate capacity to convey additional water without extensive rehabilitation (USFWS, 1986h).

3. Groundwater

The Refuge is located on the floodbasin deposits of the San Joaquin River and is bordered on the west and southwest by unconsolidated younger alluvial river deposits. The groundwater level is usually 50 feet below the land surface. Reclamation estimates the safe groundwater yield to be 16,000 acre-feet per year (USBR, 1986a). Of the 23 existing wells located on the Refuge, 16 are active.

Groundwater quality is generally good. The total dissolved solids (TDS) concentrations are usually less than 1,000 ppm. One well was reported to have 2,600 ppm TDS. Boron concentrations are less than 3 ppm. There has been a reduction in groundwater pumping in recent years due to increased energy costs and more efficient marsh management techniques.

B. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS

Service estimates that 16,000 acre-feet of water would be required for full development and optimum management of the entire Refuge. For the purposes of assessing the impact of water delivery alternatives, four levels of water supply have been identified, as presented in Table IV L-1. Each of the water supply levels provides a different volume of water and are summarized as follows:

Level 1 - Existing firm water supply

Level 2 - Current average annual water deliveries

Level 3 - Water supply needed for full use of existing development

Level 4 - Water delivery needed for optimum management

1. Delivery Alternative for Level 1 (No Action Alternative) (0 acre-feet)

The Refuge does not have an available firm water supply. Therefore, no alternatives were developed for Level 1.

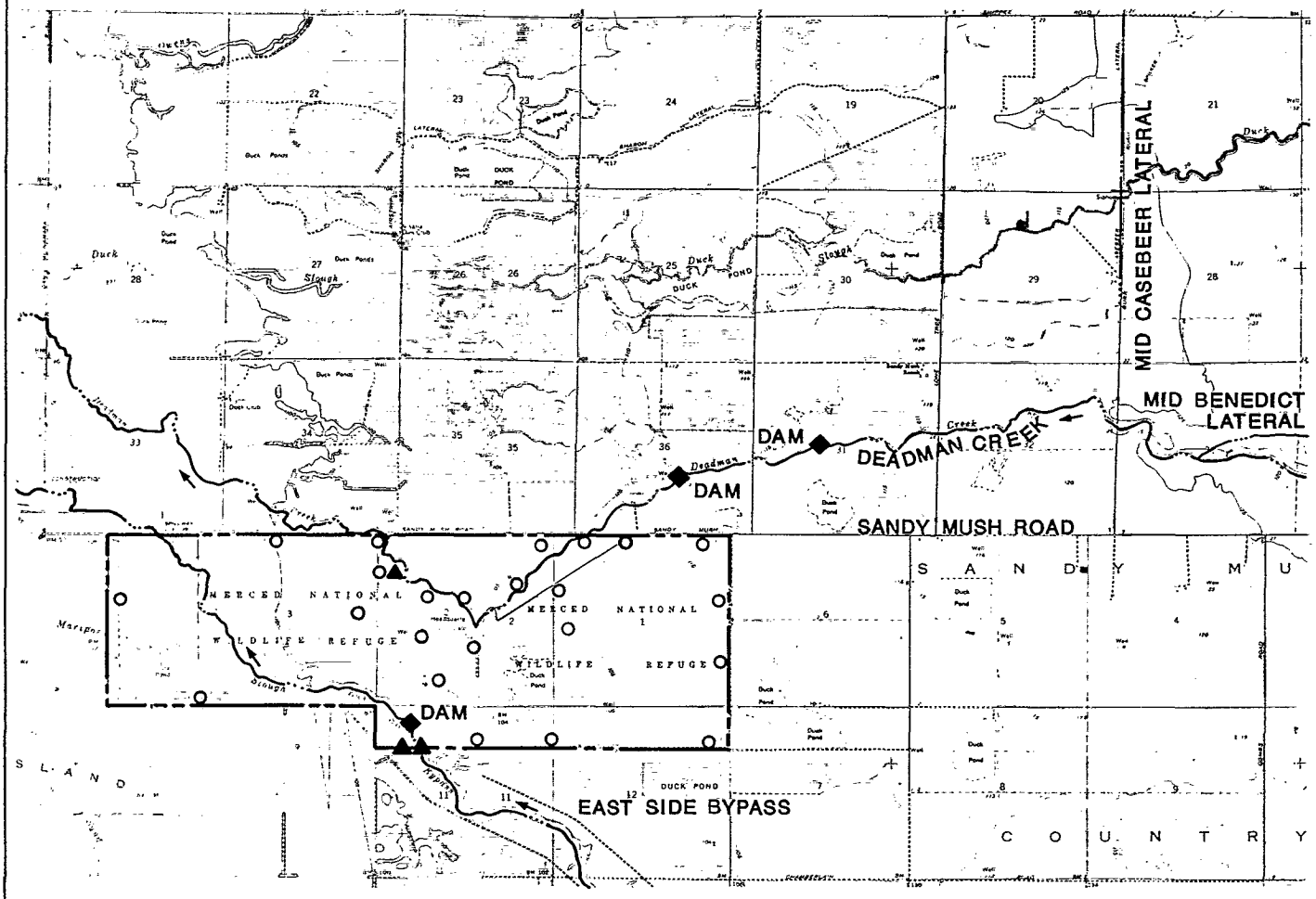


FIGURE IV L-1

MERCED NATIONAL WILDLIFE REFUGE

EXISTING WATER SUPPLY FACILITIES

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TABLE IV L-1

DEPENDABLE WATER SUPPLY NEEDS

ALTERNATIVE SUPPLY LEVELS FOR THE MERCED NWR

Month	Supply Level 1 ac-ft	Supply Level 2 ac-ft	Supply Level 3 ac-ft	Supply Level 4 ac-ft
January	0	800	1,000	1,000
February	0	100	500	500
March	0	200	600	600
April	0	500	950	950
May	0	500	800	800
June	0	800	1,000	1,000
July	0	1,100	1,050	1,050
August	0	1,200	1,500	1,500
September	0	2,300	2,700	2,700
October	0	2,300	2,700	2,700
November	0	2,000	2,000	2,000
December	0	1,700	1,200	1,200
Total	0	13,500	16,000	16,000

Notes:

Supply Level 1: Existing firm water supply
Supply Level 2: Current average annual water deliveries
Supply Level 3: Full use of existing development
Supply Level 4: Optimum management

Sources: USBR, 1986a; USFWS, 1986d and 1986e

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2. Delivery Alternatives for Level 2 (13,500 acre-feet)

Alternative 2A was developed to provide additional surface water to the Refuge.

Alternative 2A - Utilize the East Side Bypass. This alternative would provide water to the Refuge from the El Nido Water District via the East Side Bypass. Water would be pumped onto the eastern portion of the Refuge from an existing pump on the East Side Bypass. An additional pump would be constructed at this location to deliver water to the western side of the Refuge. In addition, a canal would be constructed to convey water to the eastern part of the Refuge, and a 500-foot ditch would be constructed to convey water to a new 20 cfs pump along the southern border, as shown in Figure IV L-2.

Alternative 2B - Implement a Conjunctive Use Plan. The existing wells would be used to deliver the maximum month water demand. The wells would be operated as part of a conjunctive use program. During dry years, water demands would be supplied by wells, as discussed in Chapter III. During wet years, the wells would probably not be needed if CVP water is provided. Implementation of this alternative also would require implementation of Alternative 2A.

3. Delivery Alternatives for Level 3 (16,000 acre-feet)

Alternatives 3A through 3D were developed to provide additional water to the Refuge. Alternatives 3A through 3D would require implementation of Alternative 2A. Additional water provided under Level 3 would extend the duration of flooding earlier in the fall and later in the spring. The water also would increase circulation through the Refuge which would result in a decrease in waterfowl disease.

Alternative 3A - Extend Casebeer Lateral to Refuge Boundary. This alternative would provide water to the Refuge from the Merced Irrigation District (MID) Casebeer Lateral. This lateral receives water from the Merced River. The capacity of the MID Casebeer Lateral would be increased from 20 cfs to 50 cfs from the junction of Spilber Lateral to the end of the Casebeer Lateral. In addition, the MID Casebeer Lateral would be extended south to Sandy Mush Road and west along Sandy Mush Road to the Refuge, as shown in Figure IV L-2. A flume across Deadman Creek and siphons under four roads would be constructed along the lateral extension. No water would be delivered to the Refuge when MID dewaters the canals from the end of September until April. Internal refuge construction and/or modification of water conveyance systems will be necessary to efficiently distribute the MID water.

Alternative 3B - Extend Casebeer Lateral to Deadman Creek. Deadman Creek would deliver 20 cfs from the MID Benedict Lateral and 20 cfs from Casebeer Lateral. This alternative would extend the

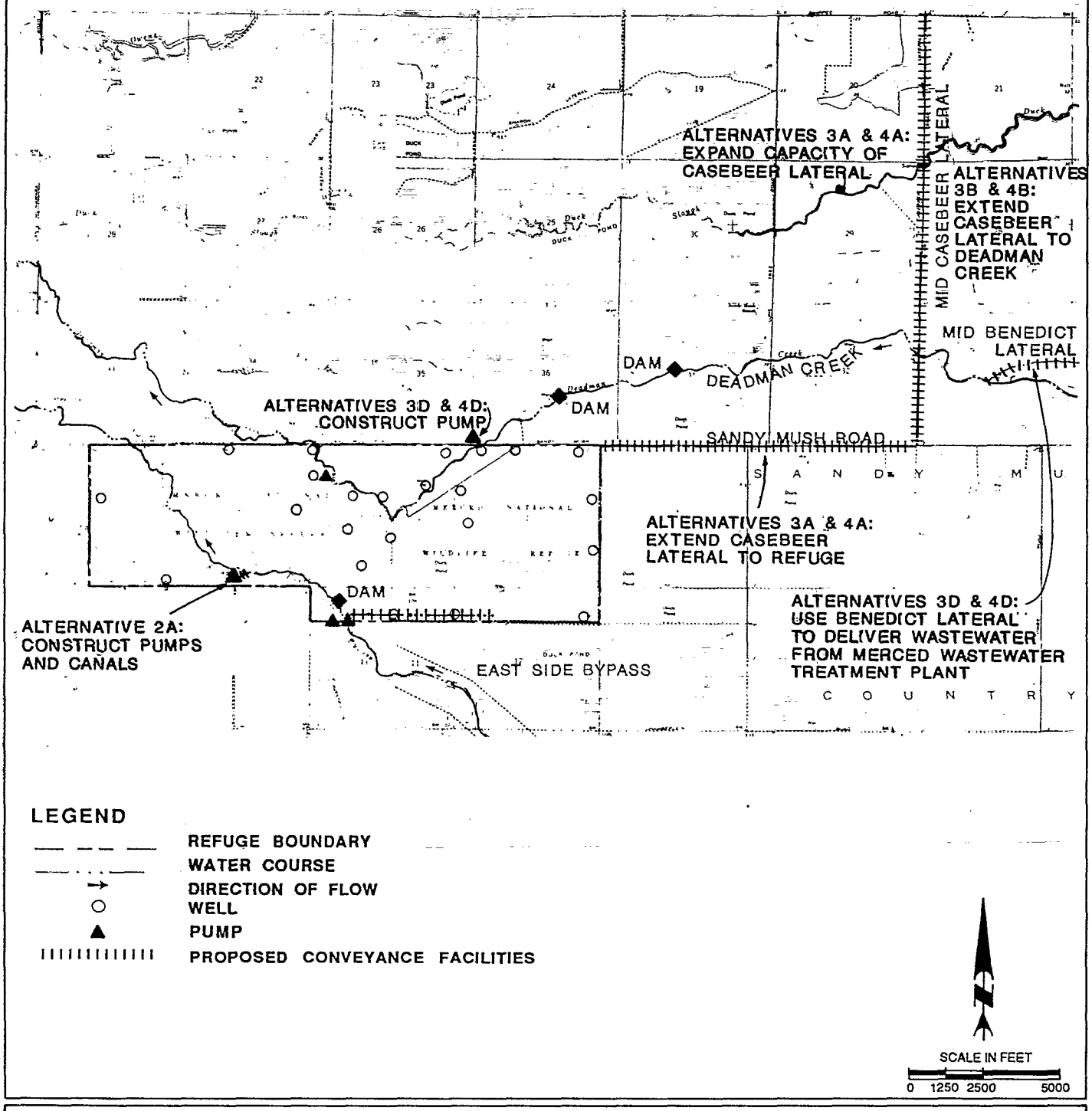

FIGURE IV L-2

MERCED NATIONAL WILDLIFE REFUGE

ALTERNATIVE WATER SUPPLY FACILITIES

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MID Casebeer Lateral to Deadman Creek. Water would be pumped from Deadman Creek onto the Refuge. No water would be delivered to the Refuge when MID dewaters the canals from the end of September until April.

Alternative 3C - Implement a Conjunctive Use Plan. Sixteen existing wells and four reactivated wells would be used to deliver the maximum month water demand. This alternative would be similar to Alternative 2B. Implementation of this alternative also would require implementation of Alternative 3A or 3B.

Alternative 3D - Utilize Treated Wastewater from the Merced Wastewater Treatment Plant. Secondary effluent from the City of Merced wastewater treatment plant would be delivered from Hartley Slough through the MID Benedict Lateral to Deadman Creek. Water would be pumped from Deadman Creek onto the Refuge. No water would be delivered to the Refuge when MID dewaters the canals from the end of September until April.

4. Delivery Alternatives for Level 4

Water Supply Level 4 is equal to Level 3, therefore the alternatives considered under Level 4 are identical to those considered for Level 3. Alternatives 3A through 3D would require implementation of Alternative 2A.

Alternative 4A - Extend Casebeer Lateral to Refuge Boundary. This alternative is identical to Alternative 3A.

Alternative 4B - Extend Casebeer Lateral to Deadman Creek. This alternative is identical to Alternative 3B.

Alternative 4C - Implement a Conjunctive Use Plan. This alternative is identical to Alternative 3C. Implementation of this alternative also would require implementation of Alternative 4A or 4B.

Alternative 4D - Utilize Treated Wastewater from the Merced Wastewater Treatment Plant. This alternative is identical to Alternative 3D.

5. Summary of Alternatives

The beneficial and adverse effects of each alternative were compared with respect to the criteria listed in Chapter III.

The Refuge does not have a dependable firm water supply, therefore no alternatives were developed for Level 1.

Alternative 2A would require a long-term conveyance agreement with the El Nido Water District. Alternatives 3A, 3B, and 3D and Alternatives 4A, 4B, and 4D would require long-term agreements with MID. Alternatives 3B and 3D and Alternatives 4B and 4D would have

high conveyance losses due to use of Deadman Creek and would require pumps to divert water onto the Refuge. Alternatives 3A and 4A may have lower conveyance losses due to the use of canals and would not require pumps to divert refuge water.

All of the alternatives for Level 3 and Level 4 would require implementation of Alternative 2A. Alternatives 3C and 4C would require implementation of surface water alternatives (Alternatives 3A, 3B, or 3D or Alternatives 4A, 4B, or 4D) to provide water during the wet years.

C. COSTS AND ECONOMIC ANALYSIS

Costs for the alternatives to provide adequate water supplies under Levels 2, 3,and 4 are presented in Table IV L-2. The construction costs include factors to cover engineering, contingencies, and overhead costs. Annual operation and maintenance (O&M) costs include only the local costs of delivering water. The annual O&M costs do not include costs to purchase CVP water or reclaimed wastewater from the Merced Wastewater Treatment Plant. During the advanced planning phase, these costs will be refined further.

Construction of the facilities under all of the alternatives would result in additional money being spent in Merced County during construction. The construction could be completed within one summer season by construction workers who reside in the area.

Currently, the annual public use to the Refuge is about 2,800 visits per year. If Level 4 water is provided, the attendance levels would increase significantly.

D. WILDLIFE RESOURCES

The annual bird use on the Refuge is approximately 7,522,400 use-days. Approximately 54 and 24 percent of the bird-use days are by ducks and geese, respectively. Wildlife resources associated with the Refuge are presented in Table IV L-3. The only listed threatened and endangered species associated with the Refuge are the San Joaquin kit fox, Vulpes macrotis mutica; Aleutian Canada goose, Branta canadensis leucopareia; American peregrine falcon, Falco peregrinus anatum; and bald eagle, Haliaeetus leucocephalus. Numerous candidate species may occur in this area and are also presented in Table IV L-4.

The additional water would be used to improve habitat in the Refuge. The improved habitat would increase the number of wildlife-use days and public-use days, as presented in Table IV L-5.

Implementation of any of the alternative plans probably would not adversely affect the listed and candidate threatened and endangered wildlife species. Detailed field investigations would be necessary during the advanced planning phase of the project. Implementation

TABLE IV L-2

SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES

MERCED NWR

Items	Alternatives					
	2A	2B	3A & 4A	3B & 4B	3C & 4C	3D & 4D
Additional Water (ac-ft)	13,500	13,500	16,000	16,000	16,000	16,000
Construction Costs						
Wells	$ --	$ --	$ --	$ --	$ 20,000(h)	$ --
Diversion Structures	--	--	--	15,520(e)	--	--
Pipelines/Canals	128,500(a)	--	142,780(c)	5,650(f)	--	--
Pump Stations	132,600(b)	--	--	183,000(g)	--	--
Subtotal	$261,100	$ --	$142,780	$204,170	$ 20,000	$ --
Other Costs	--	261,100	261,100(d)	261,100(d)	403,880(i)	--
Total	$261,100	$261,100	$403,880	$465,270	$423,880	$ --
Annualized Construction Cost (8.87%, 30 yrs)	$ 25,120	$ 25,120	$ 38,850	$ 44,760	$ 40,780	$ --
Additional Annual Cost						
Operation & Maintenance(j)	$ 3,200	$ 24,500	$ 2,140	$ 3,000	$ 36,000	$ 3,000
Power	13,500(k)	62,440(l,m)	--	16,000(k)	124,000(l,m)	16,000(k)
Local Conveyance Cost(n)	13,500	--	2,500	2,500	--	2,500
Subtotal	$ 30,200	$ 86,940	$ 4,640	$ 21,500	$160,000	$21,500
Other Costs	--	15,100(m)	30,200(d)	30,200(d)	17,420(i,m)	30,200(d)
Total	$ 30,200	$102,040	$ 34,840	$ 51,700	$177,420	$51,700
Total Annual Costs	$ 55,320	$127,160	$ 73,690	$ 96,460	$218,200	$51,200
Cost/Additional Acre/Foot	$ 4.10	$ 9.40	$ 4.60	$ 6.00	$ 13.70	$ 3.30

TABLE IV L-2

SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES

MERCED NWR
(Continued)

Notes: Alternative 2A - Utilize the East Side Bypass.
Alternative 2B - Implement a Conjunctive Use Plan.
Alternatives 3A and 4A - Extend Casebeer Lateral to Refuge Boundary.
Alternative 3B and 4B - Extend Casebeer Lateral to Deadman Creek.
Alternative 3C and 4C - Implement a Conjunctive Use Plan.
Alternative 3D and 4D - Utilize Treated Wastewater from Merced Wastewater Treatment Plant.

(a) 500 feet, unlined canal, 20 cfs; and 5,000 feet, 30-inch diameter pipeline.

(b) 10 cfs pump, 10-foot lift; and 20 cfs pump, 10 foot lift.

(c) Enlarge 8,300 feet of unlined canal, 50 cfs; construct 15,700 feet of unlined canal, 50 cfs; 42-inch diameter crossing, three 66-inch diameter crossings, and 50 cfs flume.

(d) Alternatives 3A through 3D and 4A through 4D would require Alternative 2A.

(e) 48-inch diameter turnout at Deadman Creek.

(f) 1,000 feet unlined canal, 26 cfs; 48-inch diameter crossing with riser.

(g) 20 cfs pump, 10-foot lift; and 8 cfs pump, 10-foot lift.

(h) Reactivate 4 wells.

(i) Alternatives 3C and 4C assume implementation of Alternatives 3A and 4A, respectively.

(j) Basis for O&M costs are discussed in Appendix F.

(k) Unit Pumping Cost = $1/af.

(l) Unit Pumping Cost = $9.25/af.

(m) Values are multiplied by 0.5 because facilities are assumed to be used only 5 out of 10 years.

(n) Unit Conveyance Cost = $1/af.

TABLE IV L-3

WILDLIFE RESOURCES

MERCED NWR

Ducks

Mallard[a]
Green-winged Teal[a]
Pintail[a]
Ruddy Duck[a]
Redhead[a]
Cinnamon Teal[a]
Gadwall[a]
Blue-winged Teal
Bufflehead
Wood Duck
Lesser Scaup
American Wigeon[a]
Northern Shoveler[a]
Canvasback[a]
Ring-necked Duck

Geese and Swans

Snow Goose
Ross' Goose
White-fronted Goose
Canada Goose
Cackling Canada Goose
Tundra Swan

Coots

American Coot

Shore and Wading Birds

American Avocet[a]
Black-necked Stilt[a]
Common Snipe
Long-billed Dowitcher
Least Sandpiper
Dunlin
Western Sandpiper
Greater Yellowlegs
Long-billed Curlew
Killdeer[a]
Pied-billed Grebe[a]
California Gull
White Pelican
American Bittern[a]
Great Blue Heron
Great Egret
White-Faced Ibis
Snowy Egret[a]
Black-crowned Night Heron[a]
Lesser Sandhill Crane
Greater Sandhill Crane
Virginia Rail[a]
Sora
Common Moorhen[a]

TABLE IV L-3

WILDLIFE RESOURCES

MERCED NWR
(Continued)

Upland Game

Mourning Dove[a]	Ring-necked Pheasant
Cottontail Rabbit	Black-tailed Jackrabbit

Raptorial Birds

Turkey Vulture	Black-Shouldered Kite[a]	Northern Harrier[a]
Sharp-shinned Hawk	Cooper's Hawk	Red-tailed Hawk[a]
Swainson's Hawk	American Kestrel[a]	Barn Owl[a]
Short-eared Owl	Great Horned Owl[a]	Burrowing Owl[a]
		Golden Eagle

Furbearers

Coyote	Raccoon
Skunk	Muskrat
	Long-Tailed Weasel

Notes:

(a) Birds nesting on refuge

Source: Birds of San Luis, Merced and Kesterson Wildlife Refuges (RF 11660.3. August 1984), NWRS Public Use Report (1) and refuge records.

TABLE IV L-4

FEDERALLY LISTED, PROPOSED, & CANDIDATE THREATENED & ENDANGERED SPECIES

MERCED NWR

Listed Species

Mammals
- San Joaquin kit fox, Vulpes macrotis mutica (E)

Birds
- Bald eagle, Haliaeetus leucocephalus (E)
- American peregrine falcon, Falco peregrine anatum (E)
- Aleutian canada goose, Branta canadensis leucopa (E)

Proposed Species

None

Candidate Species

Birds
- Swainson's hawk, Buteo swainsoni (2)
- White-faced ibis, Plegadis chihi (2)
- Western snowy plover, Charadrius alexandrinus nivosus (2)
- Tricolored blackbird, Agelaius tricolor (2)

Reptiles and Amphibians
- Giant garter snake, Thamnophis couchi gigas (2)
- California tiger salamander, Ambystoma tigrinium californiense (2)

Invertebrates
- Molestan blister beetle, Lytta molesta (2)

Plants
- Hispid bird's-beak, Cordylanthus mollis subsp. hispidus (2)
- Delta coyote-thistle, Eryngium racemosum (1)
- Bearded allocarya, Plagiobothrys hystriculus (2)
- Valley spearscale, Atriplex patula subsp. spicata (2)

Source: USFWS, June 4, 1987

(E)—Endangered (T)—Threatened (CH)—Critical Habitat

(1)—Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

(2)—Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

of any of the plans would result in overall beneficial environmental effects. The No Action Alternative would result in the loss of habitat. Additional regional environmental analyses will be completed as part of the Water Contracting EIS's.

E. SOCIAL ANALYSIS

The social consequences of constructing and operating the facilities under any of the alternatives would be positive due to the potential increase in wildlife use and subsequently public use.

F. POWER ANALYSIS

The Pacific Gas & Electric Company (PG&E) serves the Refuge under the PA-1 rate schedule for agricultural users. A facility must be an authorized function of the CVP to receive project-use power. The authority to delivery CVP project-use power to the Refuge is currently being examined and will be detailed in the Refuge Water Supply Planning Report. A more detailed discussion of project-use power and wheeling agreements is provided in the Power Analysis section of Chapter II.

G. PERMITS

Construction under any of the alternatives would require several permits. Merced County would issue approvals for construction along roads and drainage courses to ensure that the existing drainage facilities would not be adversely affected. Alternative 2A would require approvals from El Nido Water District for construction in the East Side Bypass. Alternatives 3A and 3B and Alternatives 4A and 4B would require approvals from MID for construction in the MID laterals. Stream Alteration Permits would be required from the DFG for construction in Deadman Creek. A Corps of Engineers permit would be required for construction activities in wetlands or riparian corridors.

TABLE IV L-5

WILDLIFE RECREATIONAL BENEFITS AND RESOURCE IMPACTS

MERCED NWR

	No Action Alternative	Alternatives					
		2A	2B	3A & 4A	3B & 4B	3C & 4C	3D & 4D
Habitat Acres							
Permanent Water	--	20	20	60	60	60	60
Seasonal Marsh	--	680	680	1140	1140	1140	1140
Bird Use Days							
Ducks	--	4,110,000	4,110,000	5,360,000	5,360,000	5,360,000	5,360,000
Geese	--	1,870,000	1,870,000	2,440,000	2,440,000	2,440,000	2,440,000
Wading and Shorebirds	--	1,540,000	1,540,000	2,005,000	2,005,000	2,005,000	2,005,000
Endangered Species	--	2,400	2,400	3,100	3,100	3,100	3,100
Total	--	7,522,400	7,522,400	9,808,100	9,808,100	9,808,100	9,808,100
Public Use Days							
Consumptive	--	900	900	900	900	900	900
Non-Consumptive	--	1,900	1,900	9,300	9,300	9,300	9,300
Total	--	2,800	2,800	10,200	10,200	10,200	10,200
Total Annual Cost	--	$ 55,320	$ 127,160	$ 73,600	$ 96,460	$ 218,200	$ 51,700
Incremental Cost/Additional 1000 Bird Use Day	N/A	$ 7.40	$ 16.60	$ 7.50	$ 9.80	$ 22.30	$ 5.30
Incremental Cost/Additional Public Use Day	N/A	$ 19.80	$ 45.40	$ 7.20	$ 9.50	$ 21.40	$ 5.10

Notes: Alternative 2A - Utilize the East Side Bypass.
Alternative 2B - Implement a Conjunctive Use Plan.
Alternatives 3A and 4A - Extend Casebeer Lateral to Refuge Boundary.
Alternatives 3B and 4B - Extend Casebeer Lateral to Deadman Creek.
Alternatives 3C and 4C - Implement a Conjunctive Use Plan.
Alternatives 3D and 4D - Utilize Treated Wastewater from Merced Wastewater Treatment Plant.

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G. PERMITS

Construction under any of the alternatives would require several permits. Merced County would issue approvals for construction along roads and drainage courses to ensure that the existing drainage facilities would not be adversely affected. Alternative 2A would require approvals from El Nido Water District for construction in the East Side Bypass. Alternatives 3A and 3B and Alternatives 4A and 4B would require approvals from MID for construction in the MID laterals. Stream Alteration Permits would be required from the DFG for construction in Deadman Creek. A Corps of Engineers permit would be required for construction activities in wetlands or riparian corridors.